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**Edmondson et al.**

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(54) **SURGICAL FORCEPS**

(56) **References Cited**

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U.S. PATENT DOCUMENTS

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3,392,727 A 7/1968 Hanlon  
3,921,640 A \* 11/1975 Freeborn ..... A61B 17/0467  
30/261

(Continued)

FOREIGN PATENT DOCUMENTS

WO WO 2012/117248 A2 9/2012

OTHER PUBLICATIONS

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Doria, et al., "Design of an underactuated compliant gripper for surgery using nitinol", *Journal of Medical Devices*, 3, 011007-1-011007-7; 2009.

(Continued)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 495 days.

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**Related U.S. Application Data**

(57) **ABSTRACT**

(60) Provisional application No. 61/868,064, filed on Aug. 20, 2013.

Surgical forceps for gripping internal organs during minimally invasive surgery are provided. The surgical forceps can be a sanitizable sheet in a folded configuration that includes a first elongate region which transitions to a resilient hinge which transitions to a second elongate region, all of which are formed of the same sheet. The first elongate region can further include a first grasper end opposite the resilient hinge and the second elongate region can include a second grasper end opposite the resilient hinge. The resilient hinge can apply a spring force to the first elongate region and the second elongate region that biases the forceps in an open configuration where the first grasper end and the second grasper end are distal from each other. When an external force is applied against the resilient hinge, the first grasper end can close against the second grasper end.

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(58) **Field of Classification Search**

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